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HOW I BECAME AN ASTRONOMER.

BY CAMILLE FLAMMARION.

How did I become an astronomer? The question is a peculiar one. You might, perhaps, just as well ask a poet, a painter, or a sculptor how his special tastes were awakened. So far as I am concerned, I cannot bring to mind the time when I first took interest in the wonders of the heavens.

When a child, as far back, in fact, as I can remember, I was moved by the glory of the starlit firmament at night and of the westering sun at eventide; my heart thrilled within me at the lordly spectacle of nature; and, like all children, my inquisitive brain was disturbed by a thousand questions. Why was this? Why was that? Where did the sun go to at setting? What were all those stars? And what about the earth whereon we live—who sustained it?

I was five and a half years old when an annular eclipse of the sun occurred to the inhabitants of the department of the Haute-Marne, where my family lived and where I was born; a second eclipse (which was a total one in Germany) was also visible in the same province when I was between nine and ten years of age. I have but a vague remembrance of the first, which occurred in the morning in the fall of the year, and seemed to bring back night shortly after sunrise; but I remember the second as if it had taken place yesterday. It was in the afternoon of a full summer day. The sky was one broad expanse of blue. The sun shone most brightly, when my mother came to fetch us, my little brother, my young sister, and myself, to go into the street, near the gable of our house, where she had caused a pail of clean water to be placed. We gazed at the image of the sun in this mirror, which was well within our reach. We saw it gradually diminish in size, as the invisible dark disk of the moon crept over its reddening face. The moon soon covered more than one-half of the orb of day. Nature put on a lurid and sinister appearance. I remember that the good old countrywomen of the place said that the end of the world was at hand.

This celestial phenomenon impressed me the more forcibly at the time because it had been foretold to a minute by the learned men of Paris, and had taken place exactly as predicted by them. I should not be surprised if the event had a decisive influence on the development of my tastes. At nine years and a half the mind and character appear to be almost formed, and to afford a fair indication of the features they are likely to evince after gaining strength. Some even may manifest those features at an earlier age. Three years previously the prefect of the department had affectionately taken me in his arms and given me a bag of sugar-plums, because I was the only pupil to answer satisfactorily a few questions in geography put by him while on a visit of inspection to the parish school.

Our house was built on the slope of a hill called the "château" because in old feudal days a castle frowned on its summit over the surrounding country. Of this ancient stronghold nothing at present remains but ruins. From this high ground, however, a commanding prospect may be enjoyed. At evening, when the sun went down, I took pleasure in going there alone to watch the appearance of the stars as they shone forth one by one in the depths of the darkening heavens. The names of a few planets and constellations had found a place in my youthful imagination: Venus, the bright evening star ; the Pleiades, or, as I called them, the hen and her six chickens ; Orion, better known to me as the rake; and the Polar Star. What were those distant worlds ? How far away were they from our globe ? What, in fact, was the whole sky whither we would fain have flown on our childish wings ?

Another reminiscence recurs of those now distant years. Having terminated my studies at the parish school, my family, when I was about ten years of age, took the necessary steps to prepare me for the ecclesiastical profession, which, as I then thought, was to be my future career. The village priest kindly volunteered to instruct me in the rudiments of Latin and Greek. As the progress I made in the dead languages was fairly rapid, I was ere long taken to Langres, a town at that time more celebrated in my eyes for its cathedral and small seminary than on account of its strategic position or its historical renown. It was a little place secluded from the rest of the world, where the steam whistle of the locomotive was scarcely heard as yet; steeped in devotion and silent as a cloister of the middle ages. Everything about it suggested religion and miracles, and the church was at the head of everything. Diderot began his classical studies where I was about to commence mine.

We were trudging up a steep ascent, my father and I, beside the tired horse that painfully tugged at the coach, when one of those problems that puzzled me most—the hundredth perhaps since our departure—suggested itself, but, somehow or other, remained inflexibly unsolved. I wanted to know what was beneath the earth and why it did not fall. My father's evasive replies only added to my curiosity. I could not detach my thoughts from the image of our globe suspended in space. It took my sleep away the following night. I repeatedly questioned my professors, but without ever receiving from them a reply that satisfied me thoroughly. One even went so far as to assure me that astronomy was a science not to be wholly relied upon, and that the old idea of the sun revolving around the earth was perhaps the best and, after all, the most probable.

I had a chum who had the half of an opera-glass in his possession. The first opportunity that offered—it was on a Wednesday, as we returned from our walk to the neighboring mountain—I looked at the moon through this rudimentary instrument. I noticed the depressions formed by the circular cavities and seas as they appear fringed by the solar light along the moon's rim. What a discovery was this! And how my heart beat! There were mountains in the moon, as on our earth! And seas! And countries! Perchance also inhabitants! The young professor who walked by my side answered each of my questions on the subject, saying: "Why not?" But to the last question he said: "Oh, as for inhabitants, that is impossible!"

The following year a comet appeared in the sky. Being only a day scholar, I was able to accompany some members of the family with whom I boarded to look at it in the evening from the ramparts of the town. Its pale light, weird appearance, and the fact that it changed its position in the sky from one evening to another, struck my childish fancy with amazement. It soared above the sunset like an airy feather, and shone with a soft, calm light that suffused the depths of the heavens. It was to me a note of interrogation poised in the infinite. But as I generally received anything but satisfactory answers to my questions, I began to hold my peace and to think for myself.

The greater number of my youthful reminiscences are of much the same kind. Of the many subjects that went to make up the course of my studies, those which related to cosmographical matters, the position of the earth, the mechanism of the seasons, the action of the sun, were among the most interesting to my mind; and, I may add, those bearing on the phenomena of terrestrial nature—the chrysalis that grows into a butterfly, the fossils with which the soil of those Jurassic regions abounds. Often at early morning in winter, before the sun rose, I have sketched the outline of Mont Blanc, which towered in the distance, while dreaming of the curve of the terrestrial globe and the dimensions of our world. The hills of the Haute-Marne, its elevated promontories that shoot up almost vertically from the extensive surrounding plains, may be looked upon as so many observatories. From their summits the eye often soars above a lower sheet of clouds, that looks like an ocean of drifted snow. It often happens also that the sidereal heavens are so clear and transparent that the gazer seems drawn upwards nearer to the stars. Thought soars over the surface of the whole broad world.

The aptitudes with which one may be endowed at birth find here a wide field and full scope for their development. It is nature herself that here addresses us. The prospects are ample and imposing, the hills graceful and verdant, the meadows richly clad; streams gurgle, birds warble, insects hum, and everything speaks of life—actual life, and also life ancient and perpetual. You cannot take up a stone, so to speak, but it contains a trace of some petrified animal.

The thought is strong within me, therefore, that I have always been in the same frame of mind wherein I am to-day.

At fourteen, when my classical studies were about terminated, my family went to live in Paris. At that age I was an omnivorous reader of works bearing more especially on natural history and astronomy. In my fifteenth year I was, above all, taken up with cosmographical questions, and wrote a big book on the origin of the world—a volume naturally incomplete and of little value, which luckily never met with a publisher, but which eventually took the form of a work of mine entitled "The World Before the Creation of Man."

A happy concourse of circumstances led me, when in my sixteenth year, to enter the Paris Observatory. I was introduced to Le Verrier by Father Babinet, as he was familiarly called, and received as an assistant astronomer at that institution. I was passionately fond of astronomy. But having read Arago's scientific treatises, especially the one which refers to Bailly, who fell a victim to revolutionary fury, I had some misgivings as to whether I should consecrate myself definitely to so austere a vocation. My hesitation will be readily understood if the picture Arago has drawn of the young astronomer is placed before the reader. Here it is:

> "The modern astronomer, who is really worthy the name, must renounce the pleasure of society and even the comfort afforded by a few hours of uninterrupted sleep. In climates like ours, during the severer seasons of the year, the sky is almost always hidden behind a thick curtain of clouds. To verify such or such a point in theory, it is necessary to watch for the slightest opening and turn it at once to account, under penalty of putting off for hundreds of years any such verification. A favorable wind dispels the vapors in the direction where, for the space of a few seconds only, some important phenomenon is about to take place. The astronomer, exposed to every inclemency of the air,—a condition best calculated to insure accuracy,—his body painfully bent, directs with all possible diligence the eye-piece of a telescope with graduated scale on the star impatiently awaited. The lines of reference are mere gossamers. If, in adjusting the instrument, he blunders by one-half the thickness of one of those lines, the observation will be null and void. Judge of his anxiety: at the critical moment a breath of wind causes the artificial light fixed upon the telescope to vibrate, so that the lines become almost invisible. The star itself, whose rays reach the eye through atmospheric strata of variable density, temperature, and refracting media, appears strongly to oscillate, so that its real position can scarcely be determined at a moment when extreme clearness in the image is indispensable to insure precision in the measurements; everything becomes confused, either because the eye-glass gets covered with vapor, or because the near approach of some very cold metal induces an abundant secretion of tears in the eye next to the telescope; the wretched observer is thereupon exposed to one of two alternatives: either he must leave to others more lucky the authentication of a phenomenon which may never once again occur during his lifetime, or introduce into science results the correctness of which is problematical. Finally, to complete the observation, he must consult the microscopic divisions of a graduated circle, when the *strained* vision, which in some superinduces blindness, must take the place of what opticians call the *indolent* vision, the only one that the ancients needed.
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> "No sooner has he escaped from this moral and physical torture than the astronomer, if he wishes to know how useful his labors may have proved, is obliged to launch into numerical reckonings of repulsive minutiæ and length. Certain calculations need a whole day's work to compare them with the tables."

In presence of such a picture one may well have cause to hesitate. M. Pasteur, whom I visited at the Normal School, advised me to enter the Museum, as natural history shared with astronomy my best predilections. The Observatory, however, won the day, and I am delighted that it did. That imposing edifice, to my eyes, was a temple. I venerated its noble traditions. I had for the author of the discovery of Neptune an unfeigned admiration, and was proud to be admitted to work under his shadow.

Such, then, is the way I became an astronomer ; or, rather, as it seems to me I have always had the same tastes, this is the way my astronomical career was decided.

Since then, however, I have found out that the ideas I had formed about astronomy and astronomers do not exactly correspond with stern reality. I noted in the temple many petty jealousies, narrow-minded ambitions, some good calculators, but very little enthusiasm for the sky, and not a particle of poetic sentiment. Several among them looked upon the science much in the same manner as if they had to make a piece of furniture or a pair of shoes. It is only fair to add that the pursuit of pure mathematics dries up every surrounding object like a fruitless blast, and that the era of physical astronomy had scarcely then reached its dawn. Within the last quarter of a century our sublime science has been wholly transformed. Instead of watching inert masses in motion through the void of space, the study of the universe as related to the physical constitution of the different worlds, the evolutions of the stars and of life, has taken its place. It is a signal advance over the old school, and may be looked upon as likely to prove the grandest feature of astronomical science in the near future.

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